

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of) Atty. Docket No.: ASAMU0005
Jinko KIMURA et al.) Confirmation No.: 8406
Serial No. 09/508,771)
Filed: March 16, 2000) Group Art Unit: 1752
For: PHOTSENSITIVE FILM) Examiner: Amanda C. WALKE
)
)
) Date: December 13, 2006

APPEAL BRIEF

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Sir:

Applicants respectfully submit this Appeal Brief under 37 C.F.R. § 1.191 with respect to the above-captioned application. The present Appeal Brief addresses and responds to all outstanding issues set forth in the Final Office Action mailed March 13, 2006.

Real Party in Interest

The real party of interest is Hitachi Chemical Company, LTD., of Tokyo, Japan.

Related Appeals and Interferences

There are no related appeals or interferences with respect to the above-captioned application.

Status of the Claims

Claims 11, 20, 26 and 39-41 have been canceled without prejudice. Claims 1-10, 12-19, 21-25, 27-38 and 42-45 stand rejected and are appealed. A copy of the appealed claims is also provided in Appendix A attached herewith.

The following claims 1-10, 12-19, 21-25, 27-38 and 42-45 are under appeal:

1. A photosensitive film which comprises a support film (A), a photosensitive resin composition-containing photosensitive resin layer (B) formed on said support film (A), and a protecting film (C) stuck onto said photosensitive resin layer (B), wherein:

the number of fish eyes having a diameter of at least 80 μm included in said protecting film (C) does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100; and

said photosensitive resin composition-containing photosensitive resin layer (B) has a film thickness of 5 to 30 μm , and whereby

generation of air voids between the photosensitive layer (B) and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film (C) from the photosensitive film is reduced.

2. A photosensitive film according to Claim 1, wherein the photosensitive resin composition in said photosensitive resin layer (B) comprises:

(a) a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;

(b) a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof; and

(c) a photopolymerization initiator.

3. A photosensitive film according to Claim 1, wherein the adhesive strength between the photosensitive resin composition-containing photosensitive resin layer (B) and the support film (A) is greater than adhesive strength between the photosensitive resin composition-containing photosensitive resin layer (B) and the protecting film (C).

4. A photosensitive film according to claim 3, wherein said protecting film is a polypropylene film.

5. A photosensitive film according to claim 1, wherein said photosensitive film is for use in metal etching process.

6. A photosensitive film according to claim 1, wherein said photosensitive resin layer has a viscosity of 15 to 50 Mpa·s at 30°C.

7. A photosensitive film according to claim 1, wherein said protecting film has a thickness of 5 to 50 μ m.

8. A photosensitive film according to Claim 2, wherein said binder polymer (a) contains a carboxyl group-containing monomer in an amount of 12 to 40% by weight based on the total amount of the monomers, has a weight-average molecular weight of 20,000 to 300,000, and is used in an amount of 40 to 80 parts by weight; wherein said monomer (b) is used in an amount of 20 to 60 parts by weight; and wherein said photopolymerization

initiator (c) is used in an amount of 0.1 to 20 parts by weight, based on 100 parts by weight of the total amounts of (a) and (b).

9. A photosensitive film according to Claim 1, wherein the support film (A) has a film thickness of 12 to 25 μ m.

10. A photosensitive film according to Claim 2, wherein the binder polymer (a) contains methacrylic acid as a constituting monomer.

11. (Canceled)

12. A photosensitive film according to Claim 2, wherein the photopolymerization initiator (c) contains 2,4,5-triarylimidazole dimer.

13. A photosensitive film according to Claim 1, wherein said photosensitive resin layer (b) has a film thickness in a range of 10-25 μ m.

14. A photosensitive film according to Claim 1, wherein the height of each fish eye, protruding from a surface of the protecting film, is in a range of 1-50 μ m.

15. A process for laminating a photosensitive film on a substrate having a metallic surface, which comprises laminating a photosensitive film of Claim 1 on a substrate, while removing the protective film (C) so as to make the photosensitive resin layer (B) adhere to

the substrate, wherein generation of air voids between the photosensitive resin later (B) and the substrate is reduced.

16. A photosensitive resin layer laminated substrate obtained by the process of Claim 15.

17. A process for curing a photosensitive resin layer, which comprises exposing the photosensitive resin layer laminated substrate of Claim 16 to light.

18. A photosensitive film according to Claim 1, wherein the protecting film (C) is a film that can be removed at a time of lamination of the photosensitive film on a substrate.

19. A photosensitive film comprising a support film, a photosensitive resin layer on said support film, and a protecting film stuck onto said photosensitive resin layer, wherein the protecting film has fish eyes of a diameter of at least 80 μ m in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100, and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced.

20. (Canceled)

21. A photosensitive film according to Claim 19, wherein adhesive strength between the photosensitive resin layer and the support film is greater than adhesive strength between the photosensitive resin layer and the protecting film.

22. A photosensitive film according to Claim 19, wherein the support film has a film thickness of 12 to 25 μ m.

23. A photosensitive film according to Claim 19, wherein the photosensitive resin layer is made from a resin composition comprising:

- (a) a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;
- (b) a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof; and
- (c) a photopolymerization initiator.

24. A photosensitive film according to Claim 23, wherein the binder polymer (a) contains a carboxyl group-containing monomer in an amount of 12 to 40% by weight based on the total amount of the monomers, has a weight-average molecular weight of 20,000 to 300,000, and is used in an amount of 40 to 80 parts by weight; wherein the monomer (b) is used in an amount of 20 to 60 parts by weight; and wherein the photopolymerization initiator (c) is used in an amount of 0.1 to 20 parts by weight, based on 100 parts by weight of the total amounts of (a) and (b).

25. A photosensitive film according to Claim 23, wherein the binder polymer (a) contains methacrylic acid as a constituent monomer.

26. (Canceled)

27. A photosensitive film according to Claim 23, wherein the photopolymerization initiator (c) contains 2,4,5-triarylimidazole dimer.

28. A photosensitive film according to Claim 19, wherein the protecting film is a polypropylene film.

29. A photosensitive film according to Claim 19, wherein the photosensitive film is a film for use in a metal etching process.

30. A photosensitive film according to Claim 19, wherein the photosensitive resin layer has a viscosity of 15 to 50 Mpa·s at 30°C.

31. A photosensitive film according to Claim 19, wherein the protecting film has a thickness of 5 to 50μm.

32. A photosensitive film according to Claim 19, wherein the protecting film is a film removed at a time of lamination of the photosensitive film on a substrate.

33. A process for laminating a photosensitive film on a substrate, which comprises laminating the photosensitive film of Claim 19 on a substrate, while removing the protecting film so as to make the photosensitive resin layer adhere to the substrate having a metallic surface.

34. A photosensitive resin layer laminated substrate obtained by the process of Claim 33.

35. A process for curing a photosensitive layer, which comprises exposing the photosensitive resin layer laminated substrate of Claim 34 to light.

36. A photosensitive film which comprises a support film (A), a photosensitive resin composition-containing photosensitive resin layer (B) formed on said support film (A), and a protecting film (C) stuck onto said photosensitive resin layer (B), wherein the number of fish eyes having a diameter of at least 80 μm included in said protecting film (C) does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100; and said photosensitive resin composition-containing photosensitive resin layer (B) has a film thickness of 5 to 30 μm , wherein generation of air voids after laminating the photosensitive film on a substrate while removing the protecting film (C) from the photosensitive film at the time of lamination is reduced.

37. A photosensitive film according to claim 1, wherein substantially no fish eyes are disposed in the protective film.

38. A photosensitive film comprising:
- (a) a support film;
 - (b) a photosensitive resin composition-containing photosensitive resin layer formed on the support film; and
 - (c) a protecting film stuck onto the photosensitive resin layer, wherein:
 - the support film is selected from the group consisting of polyester films and polyethylene terephthalate films,
 - the number of fish eyes having a diameter of at least 80 μm included in the protecting film does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100; and
 - the photosensitive resin composition-containing photosensitive resin layer has a film thickness of 5 to 30 μm , whereby
- generation of air voids is reduced between the photosensitive resin layer and a substrate after the photosensitive resin layer is laminated on the substrate after removal of the protecting film from the photosensitive resin layer.

39. (Canceled)

40. (Canceled)

41. (Canceled)

42. A photosensitive film comprising:

(a) a support film;

(b) a photosensitive resin composition-containing photosensitive resin layer formed on the support film, wherein the photosensitive resin composition in the photosensitive resin layer comprises:

- i. a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;
- ii. a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof, wherein the monomer is bisphenol A polyoxyalkylene diacrylate, or contains bisphenol A polyoxyalkylene dimethacrylate as a component; and
- iii. a photopolymerization initiator; and

(c) a protecting film stuck onto the photosensitive resin layer, wherein:

the number of fish eyes having a diameter of at least 80 μm included in the protecting film does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100; and

the photosensitive resin composition-containing photosensitive resin layer has a film thickness of 5 to 30 μm , whereby generation of air voids between the photosensitive layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced.

43. A photosensitive film comprising:

(a) a support film;

(b) a photosensitive resin layer on the support film, wherein the photosensitive resin layer is made from a resin composition comprising:

- i. a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;

- ii. a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof, wherein the monomer is bisphenol A polyoxyalkylene diacrylate or contains bisphenol A polyoxyalkylene dimethacrylate as a component; and
- iii. a photopolymerization initiator; and

(c) a protecting film stuck onto the photosensitive resin layer, wherein the protecting film has fish eyes of a diameter of at least 80 μ m in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100, and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced.

44. A photosensitive film which comprises a support film (A), a photosensitive resin composition-containing photosensitive resin layer (B) formed on said support film (A), and a protecting film (C) stuck onto said photosensitive resin layer (B) wherein the protecting film (C) is made of resin filtered after thermal melting, wherein:

the number of fish eyes having a diameter of at least 80 μ m included in said protecting film (C) does not exceed 5 fish eyes/m² when measured under a microscope at a multiplication of 100; and

said photosensitive resin composition-containing photosensitive resin layer (B) has a film thickness of 5 to 30 μ m, and whereby

generation of air voids between the photosensitive layer (B) and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film (C) from the photosensitive film is reduced.

45. A photosensitive film comprising:

a support film;

a photosensitive resin layer on said support film; and

a protecting film stuck onto said photosensitive resin layer wherein the protecting film is made of resin filtered after thermal melting and the has fish eyes of a diameter of at least 80 μ m in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100, and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced.

46. A photosensitive film which comprises a support film (A), a photosensitive resin composition-containing photosensitive resin layer (B) formed on said support film (A), and a protecting film (C) stuck onto said photosensitive resin layer (B) wherein the protecting film (C) is made of resin filtered after thermal melting, wherein:

the number of fish eyes having a diameter of at least 80 μ m included in said protecting film (C) does not exceed 5 fish eyes/m² when measured under a microscope at a multiplication of 100; and

said photosensitive resin composition-containing photosensitive resin layer (B) has a film thickness of 5 to 30 μ m, wherein generation of air voids after laminating the photosensitive film on a substrate while removing the protecting film (C) from the photosensitive film at the time of lamination is reduced.

Status of Amendments

Amendment (I), filed December 27, 2005, has been entered by the Examiner per the Final Office Action mailed March 13, 2006.

Summary of the Claimed Subject Matter

The present invention pertains generally to a photosensitive film usable in metal etching fabrication of lead frames, metal masks, and the like, with reduced generation of air voids which cause formation of defective patterns and breakage of wire. Thus, a photosensitive film, in accordance with the present invention, includes a support film, a photosensitive resin layer formed on the support film, and a protecting film stuck onto the photosensitive resin layer wherein the protecting film has a population of fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100.

In particular, the embodiments of independent claims 1, 19, 36, 38, 42, 43, 44, 45 and 46 pertain to a photosensitive film that includes a support film, a photosensitive resin layer formed on the support film, and a protecting film stuck onto the photosensitive resin layer (for example, see Figure 1a, Abstract, and at 5, lines 10-14, of Applicants' original specification), and wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100 (for example, see Abstract, and at 5, lines 10-17, and at 18, lines 9-13, of Applicants' original specification).

Independent claim 1 additionally recites that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27).

Claim 12 depends upon claim 2, which depends upon claim 1, and additionally recites that the photosensitive resin composition in the photosensitive resin layer comprises a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers, a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof; and a photopolymerization initiator (for example, see specification at 6, lines 15-23) wherein the photopolymerization initiator contains 2,4,5-triarylimidazole dimer (for example, see specification at 10, lines 20-22).

Independent claim 19 additionally recites that generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27).

Claim 27 depends upon claim 23, which depends upon claim 19, and additionally recites that the photosensitive resin composition in the photosensitive resin layer comprises a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers, a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof; and a photopolymerization initiator (for example, see specification at 6, lines 15-23) wherein the photopolymerization initiator contains 2,4,5-triarylimidazole dimer (for example, see specification at 10, lines 20-22).

Independent claim 36 additionally recites that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and wherein generation of air voids after laminating the photosensitive resin layer on a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film at the time of lamination is reduced (for example, see specification at 18, lines 2-5, and Table 2 at 19 of Applicants' original specification).

Independent claim 38 additionally recites that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and whereby generation of air voids is reduced between the photosensitive resin layer and a substrate after the photosensitive resin layer is laminated on the substrate after removal of the protecting film from the photosensitive resin layer (for example, see specification at 4, lines 22-27). Furthermore, independent claim 38 recites that the support film is selected from the group consisting of polyester films and polyethylene terephthalate films (for example, see specification at 5, line 24, to 6, line 3).

Independent claim 42 additionally recites that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27). Furthermore, independent claim 42 recites that the photosensitive resin composition in the photosensitive resin layer comprises a binder polymer formed by copolymerizing acrylic acid or methacrylic

acid and alkyl esters thereof as constituent monomers, a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof, wherein the monomer is bisphenol A polyoxyalkylene diacrylate, or contains bisphenol A polyoxyalkylene dimethacrylate as a component, and a photopolymerization initiator (for example, see specification at 6, lines 15-23, and at 8, line 25, to at 26, line 25).

Independent claim 43 additionally recites that the photosensitive resin composition in the photosensitive resin layer comprises a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers, a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof, wherein the monomer is bisphenol A polyoxyalkylene diacrylate, or contains bisphenol A polyoxyalkylene dimethacrylate as a component, and a photopolymerization initiator (for example, see specification at 6, lines 15-23, and at 8, line 25, to at 26, line 25). Independent claim 43 also recites that generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27).

Independent claim 44 additionally recites that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27). Independent claim 44 also recites that the protecting film is made of resin filtered after thermal melting (for example, see specification at 14, lines 12-16).

Independent claim 45 additionally recites that generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced (for example, see specification at 4, lines 22-27) and that the protecting film is made of resin filtered after thermal melting (for example, see specification at 14, lines 12-16).

Independent claim 46 additionally recites that that the photosensitive resin layer is a photosensitive resin composition-containing photosensitive resin layer that has a film thickness of 5 to 30 μm (for example, see specification at 5, lines 10-19) and wherein generation of air voids after laminating the photosensitive resin layer on a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film at the time of lamination is reduced (for example, see specification at 18, lines 2-5, and Table 2 at 19 of Applicants' original specification). Furthermore, independent claim 46 recites that the protecting film is made of resin filtered after thermal melting (for example, see specification at 14, lines 12-16).

The various embodiments, in accordance with the present invention, advantageously provide superior photosensitive films because the size and number of fish eyes in the fish eye population of the film is minimized. In other words, the relatively small and few fish eyes in the protecting film of the photosensitive films of the present invention improve quality and yield of semiconductor elements when manufacturing semiconductor elements.

Grounds of Rejection to be Reviewed on Appeal

The grounds for rejection presented for review are (1) the rejection of independent claims 1, 19, 36, 38, 44, 45 and 46 under 35 U.S.C. § 103(a) over U.S. Patent 4,360,582 to Taguchi (hereafter the “Taguchi Patent”) in view of U.S. Patent 5,198,484 to Mannion (hereafter the “Mannion Patent”), (2) the rejection of dependent claims 12 and 27 under 35 U.S.C. 103(a) over the Taguchi Patent in view of the Mannion Patent, and further in view of U.S. Patent 4,710,446 to Hoffman (hereafter the “Hoffman Patent”), and (3) the rejection of independent claims 42 and 43 under 35 U.S.C. § 103 over the Taguchi Patent in view of the Mannion Patent, and further in view of U.S. Patent 5,589,306 to Takahashi et al. (hereafter the “Takahashi Patent”).

Applicants' Arguments

1. A Prima Facie Case of Obviousness Under 35 U.S.C. § 103 Has Not Been Established Because Numerous Limitations in the Claims Have Been Ignored or Misconstrued.

A patentability analysis under 35 U.S.C. § 103 requires (a) determining the scope and content of the prior art, (b) ascertaining the differences between the prior art and the claimed subject matter, (c) resolving the level of ordinary skill in the pertinent art, and (d) considering secondary considerations that may serve as indicia of nonobviousness or obviousness. Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 17-18; 86 S.Ct. 684, 694; 148 U.S.P.Q. 459, 467 (1966).

In the present case, claims 1-10, 13-19, 21-25, 28-38 and 44-46 stand rejected under 35 U.S.C. § 103(a) over the Taguchi Patent in view of the Mannion Patent, claims 12 and 27 stand rejected under 35 U.S.C. 103(a) over the Taguchi Patent in view of the Mannion Patent, and further in view of the Hoffman Patent, and claims 42 and 43 stand rejected under 35 U.S.C. § 103(a) over the Taguchi Patent in view of the Mannion Patent, and further in view of the Takahashi Patent. However, as will be explained below, multiple elements in the claims, as properly construed, are not present in the asserted combinations. Specifically, the rejection ignores or misconstrues numerous elements of the claims. Appellants' position is explained in detail as follows.

A. Claims 1, 19, 36, 38, 44, 45 and 46

The following general argument pertains to independent claims 1, 19, 36, 38, 44, 45 and 46, and to dependent claims 2-10, 13-19, 21-25 and 28-38, wherein the combination of the Taguchi Patent and the Mannion Patent does not reasonably disclose a “a protecting film...wherein...the number of fish eyes having a diameter of at least 80 μm ...does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” as recited in independent claims 1, 36, 38 and 44-46 and “a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19.

i. The Taguchi Patent

The Taguchi Patent discloses a “photopolymerizable element” for producing photoresists used in manufacturing printed circuit boards that includes: (1) a layer of a photopolymerizable composition, (2) a support film laminated to the composition layer and optionally (3) a strippable protective film (see Abstract of Taguchi Patent). The thickness of the composition layer is 0.1 to 1,000 μ , or more preferably 5 to 70 μ , (Taguchi Patent, col. 9, lines 15-19), with the thickness of the film support being 5 to 100 μ (Taguchi Patent, col. 9, lines 20-22) and the thickness of the protective film being 8 to 80 μ , or more preferably 10 to 30 μ (Taguchi Patent, col. 10, lines 22-23). The protective film may be a polypropylene film or a polyethylene film (Taguchi Patent, col. 14, lines 57-60, and col. 16, lines 43-65).

More specifically, the Taguchi Patent discloses that the protective film is provided on one surface of the photopolymerizable layer and the support film is laminated onto the other surface, wherein the protective layer is used for preventing blocking at the winding step and adhesion of dust during handling (Taguchi Patent, col. 3, lines 62-68). The Taguchi Patent discloses that the film support is a transparent film capable of being dissolved or dispersed in a developer, and that the support film is selected from the group consisting of methyl methacrylate homopolymer and copolymers, vinyl chloride homopolymer and copolymers, polyvinyl alcohol, and mixtures thereof (Taguchi Patent, col. 4, lines 51-62). The Taguchi Patent discloses the use of trimethylolpropane trimethacrylate as a photopolymerizable monomer for making a photopolymerizable layer, but that other materials such as the methyl methacrylate homopolymer and copolymer and a list of other compounds would be used as an organic polymer binder (Taguchi Patent, col. 5, line 27, to col. 6, line 23).

The Taguchi Patent discloses that the use of polyethylene terephthalate as the support film has certain disadvantages, such as a tendency for the photosensitive layer to be destroyed when stripping the support film when the thickness of the photosensitive layer is reduced (Taguchi Patent, col. 2, line 38, to col. 3, line 8). The Taguchi Patent also discloses that the protective film could be selected from a polyethylene terephthalate film, a polypropylene film, a polyethylene film, a cellulose triacetate film, a cellulose diacetate film, a polyamide film, a polytetrafluoroethylene film, a paper, a polyethylene-laminated paper and a polypropylene-laminated paper (Taguchi Patent, col. 10, lines 15-24). It is important to note that Taguchi discloses that the protective film (10), such as shown in Figure 4, is an optional feature of the photopolymerizable element (Taguchi Patent, col. 14, lines 57-60). The Taguchi Patent also discloses that the photosensitive film may include a

photopolymerizable layer having a dry thickness of 10 μ that is coated onto a 50- μ thick polypropylene film (Taguchi Patent, col. 16, lines 43-64).

The Taguchi Patent explains an application of the photopolymerizable element referred to in Figures 1 to 9 (Taguchi Patent, col. 14, line 43, to col. 15, line 35). As shown in Figure 5, the protective film (10), (e.g., a polypropylene film) is peeled off and the surfaces of the photopolymerizable layers (9) and (12) are applied to both surfaces of the copper-clad insulating substrate, whereby at least both openings of each of the through-holes (4), (5) are covered with the photopolymerizable layers (9) and (12), (See Fig. 5 of Taguchi Patent and col. 14, line 59, to col. 15, line 1). The diameter of the through-holes (4) and (5), which have no relation to the fish eyes, are by far larger than the size of fish eyes. In view of the above, it is evident that the Taguchi Patent is not addressing the fish eye problem solved by the present invention.

As admitted by the Examiner (Office Action, dated November 21, 2001, at 5, lines 7-8), the Taguchi reference does not disclose “explicit details pertaining to the protective film”, which includes the claimed feature of a protecting layer that has a “number of fish eyes having a diameter of at least 80 μ m that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” as recited by independent claims 1, 36, 38 and 44-46 and “a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μ m in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19. In fact, the Examiner has repeatedly conceded that “Taguchi is silent on fish eyes” (Office Action, dated march 13, 2006, at 3, line4-5; Office Action, dated January 11, 2005, at 3, line 11; Office Action, dated March 24, 2004, at 4, line 1; and Office Action, dated August 25, 2005, at 3, lines 16-17).

Although the Examiner contends that the Taguchi Patent discloses the use of a polypropylene protective film (Office Action, dated March 13, 2006, at 3, line 5), the Examiner has conceded the fact that conventional polypropylene films vary in their characteristics (for example, see Applicants' specification, Table 2 at 19; and Ishikawa's Second Declaration under 37 C.F.R. § 1.132, filed June 13, 2005 (hereafter the "Second Ishikawa Declaration"), ¶¶ 2, 9-16 and 18) and contain fish eyes exceeding those recited by the claims of the present application (Office Action, dated August 25, 2005, at 7, lines 13-16). As established by the Second Ishikawa Declaration, ¶¶ 10-16, the physical properties of polypropylene films, such as the number and size of fish eyes of polypropylene films used as protective films, vary depending upon the manufacturing conditions of the film. For example, Example 2 and Comparative Example 2 of Table 2, at 19 of Applicants' specification, demonstrates that different polypropylene protecting films may have substantially different fish eye populations. The Second Ishikawa Declaration, ¶¶ 9-16 and 18, also establishes the fact that the polypropylene protective films taught by the Taguchi Patent would not inherently have the fish eye population recited by Applicants' claims. In fact, it is highly unlikely that a conventional polypropylene film would have the same fish eye population as that of the presently claimed invention (Second Ishikawa Declaration, ¶¶ 16 and 18).

For all of the above reasons, the Taguchi Patent does not disclose, or even suggest, a protecting layer that has a "number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100" as recited by independent claims 1, 36, 38 and 44-46 and "a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per

square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19.

ii. The Mannion Patent

The Mannion Patent discloses a “polyolefin composition containing ultrafine sorbitol and xylitol acetals” wherein a clarifying agent is incorporated into a semi-crystalline resin (See Abstract of Mannion Patent). More specifically, the Mannion Patent discloses the use of a clarifying agent for the purpose of reducing haze in articles manufactured from crystalline polyolefin resin (Mannion Patent, claim 1, and col. 1, lines 5-16). The purpose of the process and composition taught by Mannion is to address the formation of “white points,” which are bubbles formed when articles are fabricated from clarified polyolefin resins using injection molding techniques (Mannion Patent, col. 2, lines 3-7). The Mannion Patent discloses that “white point” bubbles are a problem associated with the use of sorbitol and xylitol acetal clarifying agents in polyolefin resin (Mannion Patent, col. 2, lines 3-7). During injection molding of polyolefin resins, small bubbles (i.e., “white points”) form in the side walls of injection molded housewares and medical devices due to the release of gas or volatile liquids from sintered particles upon melting during fabrication operations (Mannion Patent, col. 2, lines 7-10, and col. 5, lines 17-31).

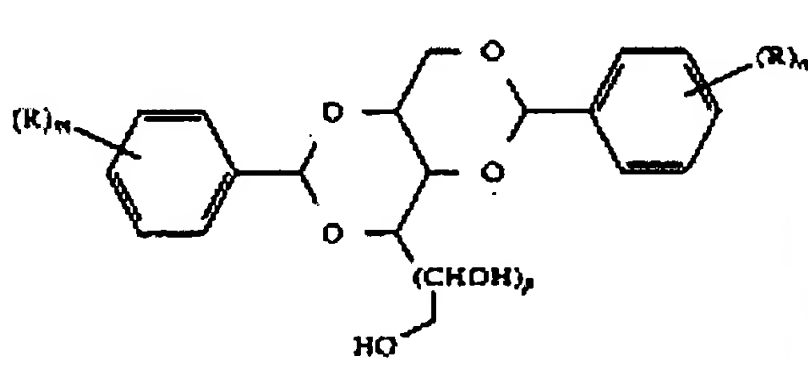
The Mannion Patent also refers to another type of bubble, known as “fish eyes,” that reportedly may form in articles of manufacture made of clarified polyolefin resin that are heated too close to the melting point of the resin (Mannion Patent, col. 2, lines 34-39). Therefore, when reading the Mannion disclosure, a person of ordinary skill in the art would realize that “bubbles” form in clarified polyolefin resins for a variety of different reasons. One type of “bubble,” the “white point,” forms due to sintering with gas release that occurs

when injection molding polyolefin resin, and another type of “bubble,” the “fish eye,” is caused by heating the resin near its melting point.

A “fish eye” in accordance with Applicants’ specification, at 3, lines 5-13, is a defect that is caused by imperfections (i.e., unmelted material or thermally deteriorated regions) created by uneven heating of raw material (See also Second Ishikawa Declaration, ¶ 10). A person of ordinary skill in the art would appreciate that the “fish eye” defects described by the Mannion Patent and by Applicants’ specification are similar in that these defects are caused by heating. On the other hand, a person of ordinary skill in the art would realize that the “white point” bubbles formed on the sides of molds by gas released during injection molding is a substantially different defect than that of the “fish eyes” described by both the Mannion Patent and Applicants’ specification.

The Mannion Patent clearly states that the defects it addresses are “white point” bubbles (Mannion Patent, col. 3, lines 8-13). The Mannion Patent does not disclose, or even suggest, that its method and composition reduces “fish eyes” such as those recited in the present claims. In other words, the Mannion Patent does not disclose, or suggest, a polyolefin resin film that includes not exceeding 5 number/m² of unmelted materials and thermally deteriorated regions (i.e., “fish eyes”) having a diameter of 80 µm or more as the Examiner contends. Furthermore, the Mannion Patent does not disclose, or suggest, any polyolefin resin film such as would be suitable for use as a protecting film for a photosensitive film.

The fact that the Mannion Patent addresses “white point” bubbles and not “fish eyes” is made even clearer by the description of how “white point” bubbles are measured. The Mannion Patent discloses that, after injection molding compounded resin pellets, resin plaques were visually inspected for the presence of “white point” bubbles (Mannion Patent, col. 9, 15-23). More specifically, the Mannion Patent states that “compounded pellets were tested for [“white point”]bubble formation by injection molding them into 2”X3”X0.05” plaques at 210°C. on a 40-ton injection molding machine. The plaques were analyzed visually for the presence of [“whitepoint”] bubbles.” (Mannion Patent, col. 9, lines 15-20). While the Mannion Patent discloses that “white point” bubbles large enough to see with the naked eye were eliminated from injection molded articles (Mannion Patent, col. 9, lines 45-48), it is silent about the population of “fish eyes” as referred to in the present claims. Although the Mannion Patent refers to “fish eyes” in the “Background of the Invention” (Mannion Patent, col. 2, lines 3-47), this patent neither addresses the formation of fish eyes in sorbitol acetal clarified resins, nor is it measuring their presence, when employing sorbitol and xylitol di-acetal clarifying agents having the general formula:



wherein p is 0 or 1, m and n are independently 0 to 3, and R is, at each occurrence, independently selected from C₁₋₈ alkyl, C₁₋₄ alkoxy, hydroxyl, halogen, C₁₋₆ alkylthio, C₁₋₆ alkylsul

carbon atoms of the unsaturated parent ring (Mannion Patent, col. 3, lines 45-65, col. 5, lines 3-5, and lines 23-27).

The only defects the Mannion Patent tested for in the resin plaques studied were large “white point” bubbles formed during injection molding. Only defects large enough to be detected by the naked eye were considered by the Mannion Patent, col. 9, lines 18-19. “Fish eyes,” in accordance with the present claims, are caused by a substantially different mechanism than “white points” and are small enough that they may not be detected by the naked eye (See instant specification, page 3, lines 8-13, and originally filed Fig. 1A; and Second Ishikawa Declaration, ¶ 17). As recited in claims 1, 36, 38 and 44-46, the protecting layer has a “number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” and, as recited in claim 19, the “protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100.” But the visual inspection test performed in the Mannion Patent cannot detect defects smaller than 89 μm because this is the resolution limit of the human eye (See the NDT Resource Center webpage, of record; and the Appendix of Amendment (G), filed September 24, 2004; and Second Ishikawa Declaration, ¶ 17).

A person of ordinary skill in the art would realize that the injection molded resin plaques taught by the Mannion Patent may be riddled with thousands of “fish eye” defects too small for the human eye to detect while being free of large “white point” defects that can be seen by the naked eye, if present. In other words, the Mannion Patent discloses a resin plaque that is free of “white point” bubbles that are large enough to be detected by the visual inspection test employed by the Mannion Patent. The Examiner’s contention that the elimination of all naked-eye visually detectable “white point” bubbles from the resin plaques,

as taught by the Mannion Patent, should be construed to include the elimination of bubbles smaller than what the naked eye can detect as well as “fish eye” bubbles is unreasonable and misconstrues the scope of subject matter actually taught by the Mannion Patent.

In particular, a person of ordinary skill in the art would realize that it is not possible to reduce the number of “fish eyes,” when this term is properly construed to be defects due to unmelted raw material or thermally deteriorated regions, by using sorbitol clarifying agent and/or xylitol acetal clarifying agent. On the contrary, a person of ordinary skill in the art would realize that the sorbitol clarifying agent and/or the xylitol acetal clarifying agent (which is a powder of mean particle diameter of 15 μm or less, see Mannion Patent, col. 6, lines 45-49) may form agglomerates or become a nucleus for creating “fish eye” defects in the first place (See, e.g., Mannion Patent at col. 3, lines 15-29). Thus, by the addition of the clarifying agent, either sorbitol clarifying agent and/or xylitol acetal clarifying agent, to the resin taught by the Taguchi Patent, the number of “fish eyes” having a diameter of 80 μm or more would be expected to undesirably increase.

Additionally, sorbitol and xylitol acetal clarifying agents are used to improve the transparency of polyolefin goods. However, the transparency of a protecting film is not an issue relevant to the presently claimed invention, and none of the examples described in Applicants’ specification employ either sorbitol and/or xylitol acetal clarifying agents for the purpose of making the protecting film. Likewise, film transparency is not an issue relevant to the protective film taught by the Taguchi Patent. On the other hand, the Mannion Patent is silent regarding the manufacture of photosensitive films, protecting films, or even films in general for that matter. Therefore, the subject matter taught by the Mannion Patent is not relevant to either Applicants’ invention or to the subject matter of the Taguchi Patent. In

short, the Mannion Patent is non-analogous art because it is from an entirely different field of endeavor than that of the subject matter of the present invention and of the Taguchi Patent.

It is a well established proposition that in order to rely on a reference as a basis for an obviousness rejection under 35 U.S.C. § 103, the reference must either be from the same field of endeavor as the applicants' invention or must be reasonably pertinent to the particular problem with which the inventor was concerned. In re Oetiker, 24 U.S.P.Q.2d 1443, 1445 (Fed. Cir. 1992). In this case, the Mannion Patent is not from the same field of endeavor as the subject matter of the present invention because the Mannion Patent pertains to improving the transparency of injection molded resin articles whereas the present invention is concerned with reducing defects in photosensitive films, which are not injected molded articles.

Furthermore, the Mannion Patent is not reasonably pertinent to the particular problem addressed by the present invention, which is to reduce the number of "fish eye" defects (i.e., defects caused by unmelted raw material or thermally degraded regions) in a protecting film of a photosensitive film. Instead, the Mannion Patent relates to eliminating visually detectable "white point" defects, which are encountered during injection molding and degrade the transparency of injection molded articles. On these facts, it is evident that the Mannion Patent is non-analogous art.

For all of the above reasons, it is evident that the Mannion Patent does not disclose, or suggest, a technique for eliminating "fish eye" defects in the photosensitive films as claimed. Therefore, the Mannion Patent does not disclose, or suggest, a protecting layer that has a "number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100" as recited by independent claims 1, 36, 38 and 44-46 and "a protecting film...wherein the protecting film has fish eyes

of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19.

iii. Summary of Disclosures

The Taguchi Patent discloses a photopolymerizable element that includes a layer of photopolymerizable composition, a film support laminated to the composition layer, and optionally a strippable protective film. The protective film taught by the Taguchi Patent may be a polypropylene film. However, the Taguchi Patent is silent with respect to the number and size of “fish eyes” in the protective film. Because the number of “fish eyes” in polypropylene protective films vary substantially, the Taguchi Patent does not disclose, or suggest, a protecting layer that has a “number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” as recited by independent claims 1, 36, 38 and 44-46 and “a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19.

The Mannion Patent discloses a polyolefin composition containing sorbitol and/or xylitol acetal clarifying agents in order to improve transparency of injected molded resin articles by eliminating “white points,” which are large “bubbles” visible to the naked eye and caused by the release of gas during sintering of resin particles during injection molding. The Mannion Patent is silent with respect to reducing “fish eye” defects and, in fact, is non-analogous art because it is from a different field of endeavor (i.e., injection molding resin articles) than that of the present invention (i.e., forming photosensitive films) and because the issue addressed by the Mannion Patent (i.e., the improvement of resin transparency) is not

relevant to the object of the present invention (i.e., reduction of “fish eye” defects). Thus, the Mannion Patent does not disclose, or suggest, a protecting layer that has a “number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” as recited by independent claims 1, 36, 38 and 44-46 and “a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19.

As is evident, because neither the Taguchi Patent nor the Mannion Patent disclose, or suggest, a protecting layer that has a “number of fish eyes having a diameter of at least 80 μm that does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100” as recited by independent claims 1, 36, 38 and 44-46 and “a protecting film...wherein the protecting film has fish eyes of a diameter of at least 80 μm in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100” as recited by independent claim 19, the Examiner has not established a prima facie showing of obviousness against claims 1, 19, 36, 38 and 44-46 of the above-captioned application.

iv. No Proper Motivation or Suggestion to Combine

A proper rejection under Section 103 further requires showing (1) that the prior art would have suggested to a person of ordinary skill in the art that they should make the claimed device or carry out the claimed process, (2) that the prior art would have revealed to a person of ordinary skill in the art that in so making or doing, there would have been a reasonable expectation of success, and (3) both the suggestion and the reasonable expectation of success must be found in the prior art and not in the applicants’ disclosure. In re Vaeck, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). However, the combination of elements from non-analogous

example, if no fish eyes are seen with the naked eye that does not mean that no fish eyes will be seen at a multiplication of 100. This is particularly true if defects of 80 μ m diameter, as recited in the claims, are measured, because those defects are below the limit of detection with the naked eye.

For the above reasons, the recitation of “the number of fish eyes having a diameter of at least 80 μ m included in said protecting film... does not exceed 5 fish eyes/m² when measured under a microscope at a multiplication of 100,” such as recited in claim 1, employs the phrase “when measured under a microscope at a multiplication of 100” in a manner that does further limit the claims. Thus, the Examiners’ rejection of claims 1, 19, 36, 38 and 44-46 is facially flawed and must be withdrawn because it does not give patentable weight to the phrase “when measured under a microscope at a multiplication of 100” and because neither the Taguchi Patent nor the Mannion Patent disclose or suggest this limitation of the claimed invention.

As discussed above, how the “fish eyes” are measured does effect the observed “fish eye” population, and it is an observed “fish eye” population that is recited as a limitation in Applicants’ claims. On the other hand, it is an observed “white point” population that is reasonably taught by the Mannion Patent. The Mannion Patent explicitly quantifies its “white point” population based on visualization using a naked eye; therefore, the use of the term “eliminates” in the context of the Mannion Patent’s specification, when taken as a whole, is limited to the elimination of “white point” defects that are visible to the naked eye. There is no teaching in the Mannion Patent that would lead a person of ordinary skill in the art to believe that “white point” defects smaller than what the naked eye can detect have been eliminated.

Applicants' remind the Examiner that a reference must be given a fair reading for what it teaches as a whole. In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). In this case, the Mannion Patent discloses evaluation of resin plaques using the naked eye. Therefore, the disclosure of the Mannion Patent with respect to characterizing the population of "white point" defects is limited to defects that are observable by the naked eye. The Mannion Patent discloses or suggests nothing regarding the presence of "white point" defects that are smaller than the limits of detection achievable by the tests employed by the Mannion Patent (i.e., visual scanning with the naked eye). Therefore, the Examiner's contention that the Mannion Patent discloses the elimination of "white points" that are smaller than what the naked eye can detect is neither explicitly taught by the Mannion Patent, nor reasonably inferable from the disclosure of the Mannion Patent. In sum, the Examiner has not given a fair reading of what the Mannion Patent discloses as a whole when the Examiner contends that the Mannion Patent discloses elimination of all "white points" including those smaller than the tests employed by the Mannion Patent could possibly detect. The Mannion Patent discloses nothing regarding defects smaller than those that can be seen by the naked eye.

Because the Examiner has failed to give patentable weight to the phrase "when measured under a microscope at a multiplication of 100" as recited by claims 1, 19, 36, 38 and 44-46, and because the Examiner has failed to recognize that the Mannion Patent discloses the use of a specific class of sorbitol and xylitol di-acetal clarifying agents for eliminating "white points" and not "fish eyes," the Examiner's Section 103 rejection is based on a misinterpretation of the claims, is fatally flawed and must be withdrawn.

The Examiner also erroneously contends that the Mannion Patent discloses the elimination of “fish eyes” from injection molded articles (Office Action, dated March 13, 2006, at 7, lines 15-18). While the Mannion Patent discloses that there are two types of bubble defects, “white points” and “fish eyes,” this distinction is made in the “Background of the Invention” (Mannion Patent, col. 2, lines 5-53). When the Mannion Patent describes its new sorbitol and xylitol di-acetal clarifying agent, it discusses only the elimination of “white point” bubbles (Mannion Patent, col. 5, lines 3-27). Therefore, a person of ordinary skill in the art, after reading the Mannion Patent, would instantly realize that the Mannion Patent discloses sorbitol and xylitol di-acetal clarifying agents for eliminating “white point” bubbles that are large enough to see with the naked eye, and that it does not disclose a mechanism for eliminating “fish eyes,” including “fish eyes” that are smaller than can be detected by the naked eye.

B. Claims 12 and 27

Claims 12 and 27 depend, respectively, on claims 2 and 23, which depend respectively on independent claims 1 and 19. Therefore, the arguments in support of instant claims 12 and 27, respectively, incorporates the arguments in support of patentability of claims 1 and 19.

The following additional general argument pertains to claims 12 and 27, wherein the combination of the Taguchi Patent, the Mannion Patent and the Hoffman Patent does not reasonably disclose the claimed population of “fish eyes” that is “measured under a microscope at a multiplication of 100” and additionally recite that “the photoinitiator...contains 2,4,5-triarylimidazole dimmer.” As admitted by the Examiner, the Taguchi Patent fails to disclose, or even suggest, “the photoinitiator...contains 2,4,5-

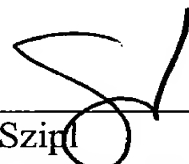
the Mannion Patent is non-analogous art and does not address the same problem as is solved by Applicants' invention, namely, reducing the number of fish eyes in a protecting film of a photosensitive film.

Lastly, assuming, *arguendo*, the Examiner had established a prima facie case of obviousness (which the Examiner has not done), the evidence of substantially superior and unexpected results presented in Applicants' specification, as originally filed, is sufficient indicia of non-obviousness to overcome such an alleged prima facie case.

For all of the above reasons, the Examiner has not established a prima facie case of obviousness against claims 1-10, 12-19, 21-25, 27-38 and 42-46 of the above-captioned application.

Respectfully submitted,

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the support film (A) is greater than adhesive strength between the photosensitive resin composition-containing photosensitive resin layer (B) and the protecting film (C).

4. A photosensitive film according to claim 3, wherein said protecting film is a polypropylene film.

5. A photosensitive film according to claim 1, wherein said photosensitive film is for use in metal etching process.

6. A photosensitive film according to claim 1, wherein said photosensitive resin layer has a viscosity of 15 to 50 Mpa·s at 30°C.

7. A photosensitive film according to claim 1, wherein said protecting film has a thickness of 5 to 50μm.

8. A photosensitive film according to Claim 2, wherein said binder polymer (a) contains a carboxyl group-containing monomer in an amount of 12 to 40% by weight based on the total amount of the monomers, has a weight-average molecular weight of 20,000 to 300,000, and is used in an amount of 40 to 80 parts by weight; wherein said monomer (b) is used in an amount of 20 to 60 parts by weight; and wherein said photopolymerization initiator (c) is used in an amount of 0.1 to 20 parts by weight, based on 100 parts by weight of the total amounts of (a) and (b).

9. A photosensitive film according to Claim 1, wherein the support film (A) has a film thickness of 12 to 25 μ m.

10. A photosensitive film according to Claim 2, wherein the binder polymer (a) contains methacrylic acid as a constituting monomer.

11. (Canceled)

12. A photosensitive film according to Claim 2, wherein the photopolymerization initiator (c) contains 2,4,5-triarylimidazole dimer.

13. A photosensitive film according to Claim 1, wherein said photosensitive resin layer (b) has a film thickness in a range of 10-25 μ m.

14. A photosensitive film according to Claim 1, wherein the height of each fish eye, protruding from a surface of the protecting film, is in a range of 1-50 μ m.

15. A process for laminating a photosensitive film on a substrate having a metallic surface, which comprises laminating a photosensitive film of Claim 1 on a substrate, while removing the protective film (C) so as to make the photosensitive resin layer (B) adhere to the substrate, wherein generation of air voids between the photosensitive resin later (B) and the substrate is reduced.

16. A photosensitive resin layer laminated substrate obtained by the process of Claim 15.

17. A process for curing a photosensitive resin layer, which comprises exposing the photosensitive resin layer laminated substrate of Claim 16 to light.

18. A photosensitive film according to Claim 1, wherein the protecting film (C) is a film that can be removed at a time of lamination of the photosensitive film on a substrate.

19. A photosensitive film comprising a support film, a photosensitive resin layer on said support film, and a protecting film stuck onto said photosensitive resin layer, wherein the protecting film has fish eyes of a diameter of at least 80 μ m in a number not exceeding 5 per square meter when measured under a microscope at a multiplication of 100, and whereby generation of air voids between the photosensitive resin layer and a substrate after lamination of the photosensitive film on the substrate while removing the protecting film from the photosensitive film is reduced.

20. (Canceled)

21. A photosensitive film according to Claim 19, wherein adhesive strength between the photosensitive resin layer and the support film is greater than adhesive strength between the photosensitive resin layer and the protecting film.

22. A photosensitive film according to Claim 19, wherein the support film has a film thickness of 12 to 25 μ m.

23. A photosensitive film according to Claim 19, wherein the photosensitive resin layer is made from a resin composition comprising:

- (a) a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;
- (b) a monomer having at least one polymerizable ethylenically unsaturated group in the molecule thereof; and
- (c) a photopolymerization initiator.

24. A photosensitive film according to Claim 23, wherein the binder polymer (a) contains a carboxyl group-containing monomer in an amount of 12 to 40% by weight based on the total amount of the monomers, has a weight-average molecular weight of 20,000 to 300,000, and is used in an amount of 40 to 80 parts by weight; wherein the monomer (b) is used in an amount of 20 to 60 parts by weight; and wherein the photopolymerization initiator (c) is used in an amount of 0.1 to 20 parts by weight, based on 100 parts by weight of the total amounts of (a) and (b).

25. A photosensitive film according to Claim 23, wherein the binder polymer (a) contains methacrylic acid as a constituent monomer.

26. (Canceled)

27. A photosensitive film according to Claim 23, wherein the photopolymerization initiator (c) contains 2,4,5-triarylimidazole dimer.
28. A photosensitive film according to Claim 19, wherein the protecting film is a polypropylene film.
29. A photosensitive film according to Claim 19, wherein the photosensitive film is a film for use in a metal etching process.
30. A photosensitive film according to Claim 19, wherein the photosensitive resin layer has a viscosity of 15 to 50 Mpa·s at 30°C.
31. A photosensitive film according to Claim 19, wherein the protecting film has a thickness of 5 to 50μm.
32. A photosensitive film according to Claim 19, wherein the protecting film is a film removed at a time of lamination of the photosensitive film on a substrate.
33. A process for laminating a photosensitive film on a substrate, which comprises laminating the photosensitive film of Claim 19 on a substrate, while removing the protecting film so as to make the photosensitive resin layer adhere to the substrate having a metallic surface.

the support film is selected from the group consisting of polyester films and polyethylene terephthalate films,

the number of fish eyes having a diameter of at least 80 μm included in the protecting film does not exceed 5 fish eyes/ m^2 when measured under a microscope at a multiplication of 100; and

the photosensitive resin composition-containing photosensitive resin layer has a film thickness of 5 to 30 μm , whereby

generation of air voids is reduced between the photosensitive resin layer and a substrate after the photosensitive resin layer is laminated on the substrate after removal of the protecting film from the photosensitive resin layer.

39. (Canceled)

40. (Canceled)

41. (Canceled)

42. A photosensitive film comprising:

(a) a support film;

(b) a photosensitive resin composition-containing photosensitive resin layer formed on the support film, wherein the photosensitive resin composition in the photosensitive resin layer comprises:

i. a binder polymer formed by copolymerizing acrylic acid or methacrylic acid and alkyl esters thereof as constituent monomers;

EVIDENCE APPENDIX (B)

1. Declaration under 37 C.F.R. § 1.132 of Chikara ISHIKAWA dated November 19, 2002 and entered by the Examiner as set forth by the Office Action, dated. August 25, 2006 page 6 at 5, lines 3-5.
2. Second Declaration under 37 C.F.R. § 1.132 of Chikara ISHIKAWA dated June 1, 2005 and entered by the Examiner as set forth by the Office Action, dated August 25, 2005, at 6, lines 17-19.

RELATED PROCEEDINGS APPENDIX (C)

None.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of)
Jinko KIMURA et al.) Atty. Docket No.: ASAMU0005
Serial No. 09/508,771)
Filed: March 16, 2000) Group Art Unit: 1752
For: PHOTSENSITIVE FILM) Examiner: C. Hamilton
)
)

DECLARATION UNDER 37 C.F.R. § 1.132

Assistant Commissioner for Patents
Washington, D. C. 20231

1. I, Chikara ISHIKAWA, state that I am an over 21 years old and competent to make this declaration. A copy of my curriculum vitae is attached hereto.

2. I am familiar with the above-captioned patent application, the invention claimed therein, and the prior art references cited against the claims of the application in the office action dated April 16, 2002. Specifically, I am familiar with the Fifield et al. reference (German Document DE 3825782 A1).

3. The foregoing experimental results were collected by me, or by others under my direct supervision, and the experiments contained herein were performed under my direction or with my understanding and knowledge.

CHIKARA ISHIKAWA
1325 Akahama,
Takahagi-shi, Ibaraki-ken, Japan
(Japanese Citizen)

March 1993

Graduated from a master course of Faculty of Engineering, Yamagata University

April 1993

Began employment with Hitachi Chemical Company, Ltd. And has been engaged in said company since that time in the study and development of photosensitive films.

Inventor of U.S. Patent Application Serial No. 09/508,771 and is well aware of the prosecution history thereof.

